In re Patent Application of:
AMMAR
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In the Claims:

1. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module comprising:

a microwave monolithic integrated circuit (MMIC) having ~~at least one amplifier~~ a plurality of amplifiers; and

a controller comprising a microprocessor and memory that includes stored values of preset MMIC characteristics at various stages in a radio frequency circuit and operatively connected to said MMIC for sensing amplifier operating conditions including amplifier current, temperature and power output and tuning the ~~at least one amplifier~~ plurality of amplifiers to an optimum operating condition based on the stored values and at least one of the sensed operating conditions in a test and normal operational mode, and further comprising a digital potentiometer and current sensor operatively connected to each amplifier, and a temperature sensor operatively connected to said microprocessor, wherein a preset current draw from each amplifier can be maintained constant as module temperature changes to allow self-adjustment in amplifier gain as a function of temperature changes.

2. (ORIGINAL) A self-tuned millimeter wave transceiver module according to Claim 1, wherein said controller comprises a surface mounted microcontroller chip operatively connected to said MMIC.

3. (CANCELLED)

4. (PREVIOUSLY PRESENTED) A self-tuned millimeter wave transceiver module according to Claim 1, wherein said memory comprises an EEPROM.

5. (PREVIOUSLY PRESENTED) A self-tuned millimeter wave transceiver module according to Claim 1, wherein said stored values comprise optimum drain current and expected amplifier output.

6. (CANCELLED)

7. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module according to ~~Claim 6, and further comprising a~~ Claim 1, wherein said digital potentiometer ~~operatively connected to said at least one amplifier for stepping~~ steps gate voltage within ~~the at least one~~ each amplifier based on sensed changes in amplifier operating conditions.

8. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module according to ~~Claim 6~~ Claim 1, and further comprising a multi-channel analog-to-digital converter operatively connected to said temperature sensor and current sensor for digitizing sensor output to be compared with stored values of optimum operating conditions.

9. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module according to Claim 1, ~~and further comprising a~~ wherein said temperature sensor ~~for measuring~~ measures the temperature of said MMIC, wherein said controller

is responsive to sensed temperature for determining whether any change in amplifier operating conditions is a result of a changed temperature or a malfunction.

10. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module according to Claim 1, and further comprising a power sensor diode operatively connected to ~~said at least one~~ each amplifier, wherein said controller is responsive to said power sensor diode for tuning ~~said at least one~~ each amplifier.

11. (ORIGINAL) A self-tuned millimeter wave transceiver module according to Claim 1, wherein said controller is operative for correcting one of at least (a) gain variation over temperature; (b) linearization of the power monitor circuit as a function of temperature and frequency; (c) gain equalization as a function of frequency; and (d) power attenuation linearization as a function of frequency and temperature.

12. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module comprising:

a microwave monolithic integrated circuit (MMIC) having a plurality of amplifiers, each having a respective source, drain and gate;

a controller operatively connected to said MMIC and each of said amplifiers, said controller comprising a microprocessor and a memory having stored values of optimum operating conditions for an amplifier, including stored values of preset MMIC characteristics at various stages in a radio

frequency circuit, wherein said controller is operative for sensing operating conditions including amplifier current, temperature and power output and tuning each amplifier either individually or in groups to an optimized operating condition based on the stored values and at least one of the sensed operating conditions in a test and in a normal operational mode, and further comprising a digital potentiometer and current sensor operatively connected to each amplifier, and a temperature sensor operatively connected to said microprocessor, wherein a preset current draw from each amplifier can be maintained constant as module temperature changes to allow self-adjustment in amplifier gain as a function of temperature changes.

13. (CANCELLED)

14. (ORIGINAL) A self-tuned millimeter wave transceiver module according to Claim 12, wherein said controller comprises a surface mounted microcontroller chip operatively connected to said MMIC.

15. (ORIGINAL) A self-tuned millimeter wave transceiver module according to Claim 12, wherein said memory comprises an EEPROM.

16. (PREVIOUSLY PRESENTED) A self-tuned millimeter wave transceiver module according to Claim 12, wherein said stored values of optimum operating conditions comprise optimum drain current and expected amplifier output.

17. (ORIGINAL) A self-tuned millimeter wave transceiver module according to Claim 12, wherein said controller further comprises at least one sensor for measuring changes in current drawn by the amplifiers, wherein said controller adjusts the amplifiers based on changes in current and the stored values for optimum operating conditions.

18. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module according to Claim 12, ~~and further comprising a~~ wherein said digital potentiometer ~~operatively connected to the amplifiers for stepping~~ steps gate voltage within the amplifiers based on sensed operating conditions in each amplifier.

19. (ORIGINAL) A self-tuned millimeter wave transceiver module according to Claim 12, wherein said controller further comprises a multi-channel, analog-to-digital converter that digitizes sensed operating conditions to be compared with stored values of optimum operating conditions.

20. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module according to Claim 12, ~~and further comprising a~~ wherein said temperature sensor ~~for measuring~~ measures the temperature of said MMIC, wherein said controller is responsive to sensed temperature for determining whether any change in amplifier current is a result of changed temperature conditions or malfunction.

21. (CURRENTLY AMENDED) A self-tuned millimeter wave transceiver module according to Claim 12, and further

comprising a power sensor diode operatively connected to ~~said at least one~~ each amplifier, wherein said controller is responsive to said power sensor diode for tuning ~~said at least one~~ each amplifier.

22. (ORIGINAL) A self-tuned millimeter wave transceiver module according to Claim 12, wherein said controller is operative for correcting one of at least (a) gain variation over temperature; (b) linearization of the power monitor circuit as a function of temperature and frequency; (c) gain equalization as a function of frequency; and (d) power attenuation linearization as a function of frequency and temperature.